

## CLAIMS

1. An electrode for electric discharge surface treatment, the electrode is a green compact made by compression molding metallic powders or metallic compound powders and used for electric discharge surface treatment in which a pulsed electric discharge is generated between the electrode and a work in a dielectric fluid to form by the electric discharge energy on the surface of the work a coat of a material of the electrode or of a substance that is generated by a reaction of the electrode due to the electric discharge energy, wherein the electrode contains 40 volume % or more metallic material that is not carbonized or is hard to be carbonized.
2. The electrode for electric discharge surface treatment according to claim 1, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.
3. An electrode for electric discharge surface treatment, the electrode is a green compact made by compression molding metallic powders or metallic compound powders and used for electric discharge surface treatment in which a pulsed electric discharge is generated between the electrode and a work in a dielectric fluid to form by the electric discharge energy on the surface of the work a coat of a material of the electrode or of a substance that is generated by a reaction of the electrode due to the electric discharge energy, wherein the electrode is made from a powder of an alloy material that is alloyed

by mixing a plurality of elements in a predetermined ratio.

4. The electrode for electric discharge surface treatment according to claim 3, made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.
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5. The electrode for electric discharge surface treatment according to claim 3, wherein the alloy material contains 40 volume % or more metallic material that is not carbonized or is hard to be carbonized.

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6. The electrode for electric discharge surface treatment according to claim 5, made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

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7. The electrode for electric discharge surface treatment according to claim 5, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.

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8. The electrode for electric discharge surface treatment according to claim 3, wherein the alloy material is a Co alloy containing Cr, Ni, and W with Co as a main component; a Co alloy containing Mo, Cr, and Si with Co as a main component; an Ni alloy containing Cr, and Fe with Ni as a main component; an Ni alloy containing Cr, Mo and Ta with Ni as a main component; and an Fe alloy containing Cr, Ni, Mo, (Cb + Ta), Ti, and Al with Fe as a main component.

9. The electrode for electric discharge surface treatment according to claim 8, made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

5 10. A method of electric discharge surface treatment, comprising:  
generating pulsed electric discharge in a dielectric fluid between a green compact electrode and a work, the electrode being made by compression molding a metallic powder or metallic compound powders; and

10 forming a coat that contains a carbide and a non-carbonized metallic component in a predetermined ratio based on materials supplied from the green compact electrode on a surface of the work using an energy of the electric discharge.

15 11. The method of electric discharge surface treatment according to claim 10, wherein the ratio of the non-carbonized metallic component is 30 volume % or more.

12. The method of electric discharge surface treatment according to 20 claim 11, wherein the coat is formed on the surface of the work by letting discharge the electrode that contains 40 volume % or more metallic material that is not carbonized or is hard to be carbonized.

13. The method of electric discharge surface treatment according to claim 10, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.

5 14. The method of electric discharge surface treatment according to claim 10, wherein the material of the work is a directional control alloy such as single crystal alloy or unidirectionally solidified alloy.

10 15. A method of electric discharge surface treatment of using an electrode that is a green compact made by compression molding metallic powders or metallic compound powders for electric discharge surface treatment in which a pulsed electric discharge is generated between the electrode and a work in a dielectric fluid to form by the electric discharge energy on the surface of the work a coat of a 15 material of the electrode or of a substance that is generated by a reaction of the electrode due to the electric discharge energy, wherein the coat is formed by using an electrode made from a powder of an alloy material that is alloyed by mixing a plurality of elements in a predetermined ratio.

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16. The method of electric discharge surface treatment according to claim 15, wherein the electrode is made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

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17. The method of electric discharge surface treatment according to claim 15, wherein the material of the work is a directional control alloy such as single crystal alloy or unidirectionally solidified alloy.

5 18. The method of electric discharge surface treatment according to claim 15, wherein the alloy material contains 40 volume % or more metallic material that is not carbonized or is hard to be carbonized.

10 19. The method of electric discharge surface treatment according to claim 18, wherein the electrode is made by mixing a powder of the alloy material with a powder of at least one of Co, Ni, and Fe.

15 20. The method of electric discharge surface treatment according to claim 18, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.

21. The method of electric discharge surface treatment according to claim 15, wherein the alloy material is a Co alloy containing Cr, Ni, and W with Co as a main component; a Co alloy containing Mo, Cr, and Si with Co as a main component; an Ni alloy containing Cr, and Fe with Ni as a main component; an Ni alloy containing Cr, Mo and Ta with Ni as a main component; and an Fe alloy containing Cr, Ni, Mo, (Cb + Ta), Ti, and Al with Fe as a main component.

22. The method of electric discharge surface treatment according to claim 21, wherein the electrode is made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

5 23. An apparatus for electric discharge surface treatment, comprising:

an electrode of a green compact made by compression molding powders containing 40 volume % or more metallic material that is not carbonized or is hard to be carbonized;

10 a dielectric fluid supply unit to immerse the electrode and a work in the dielectric fluid or that supplies the dielectric fluid between the electrode and the work; and

a power source unit that generates pulsed electric discharge by applying voltage between the electrode and the work.

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24. The apparatus for electric discharge surface treatment according to claim 23, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.

20 25. An apparatus for electric discharge surface treatment, comprising:

an electrode of green compact made from a powder of an alloy material that is alloyed by mixing a plurality of elements in a predetermined ratio;

25 a dielectric fluid supply unit to immerse the electrode and a

work in the dielectric fluid or that supplies the dielectric fluid between the electrode and the work; and

a power source unit that generates pulsed electric discharge by applying voltage between the electrode and the work.

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26. The apparatus for electric discharge surface treatment according to claim 25, wherein the electrode is made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

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27. The apparatus for electric discharge surface treatment according to claim 25, wherein the alloy material contains 40 volume % or more metallic material that is not carbonized or is hard to be carbonized.

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28. The apparatus for electric discharge surface treatment according to claim 27, wherein the electrode is made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.

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29. The apparatus for electric discharge surface treatment according to claim 27, wherein the metallic material that is not carbonized or is hard to be carbonized is Co, Ni, or Fe.

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30. The apparatus for electric discharge surface treatment according to claim 25, wherein the alloy material is a Co alloy containing Cr, Ni, and W with Co as a main component; a Co alloy containing Mo, Cr, and Si with Co as a main component; an Ni alloy containing Cr, and Fe with Ni as a main component; an Ni alloy containing Cr, Mo and Ta with Ni as a main component; and an Fe alloy containing Cr, Ni, Mo, (Cb + Ta), Ti, and Al with Fe as a main component.

5 10 31. The apparatus for electric discharge surface treatment according to claim 30, wherein the electrode is made by mixing a powder of at least one of Co, Ni, and Fe to the powder of the alloy material.